CALIBRATION STANDARD REQUIREMENT

FOR A

PULSE GENERATOR

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PROCUREMENT PACKAGE

Prepared by: Naval Warfare Assessment Division
Measurement Science Directorate
Code MS-33
Corona, CA 91718-5000

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1. SCOPE

1.1 Scope. This requirement defines the mechanical and electrical performance requirements for a Pulse Generator. The Pulse Generator provid General Purpose Interface Bus (GPIB) capabilities in accordance with IEEE-S 488. The Pulse Generator is intended for use by shipboard and shorebased N personnel in association with calibration equipment used to calibrat electronic test equipment such as pulse power meters. Hereinafter the Pul Generator will be referred to as the PG.

2. APPLICABLE DOCUMENTS

2.1 Controlling Specifications. MIL-T-28800, "Military requirement, Test Equipment for use with Electrical and Electronic Equipment, Genera specification for," and all documents referenced therein of the issues effect on the date of this solicitation shall form a part of this requireme

3. REQUIREMENTS

3.1 General. The PG shall conform to the Type II, Class 5, Style E requirements as specified in MIL-T-28800 for Navy shipboard and shorebased as modified below.

3.1.1 Design and Construction. The PG design and construction shall meet the requirements of MIL-T-28800 for Type III equipment.

3.1.2 Power requirements. The PG shall operate from a source of 103.5V to 126.5V at 60Hz (5% single phase input power as specified in MIL-T-28800.

3.1.2.1 Fuses or Circuit Breakers. Fuses or circuit breakers shall be provided. If circuit breakers are used, both sides of the power source sha be automatically disconnected from the equipment in the event of excessi current. If fuses are used, only the line side of the input power line, defined by MIL-T-28777, shall be fused. Fuses or circuit breakers shall readily accessible.

3.1.2.2 Power Connection. The requirements for power source connections shall be in accordance with MIL-T-28800 with a 6 foot (1.8 m) minimum leng cord.

3.1.3 Dimension and Weight. Maximum dimensions shall not exceed 17 inches (43.2 cm) in width, 4 inches (10.2 cm) in height, and 18 inch (45.7 cm) in depth. The weight shall not exceed 25 pounds (11.4 Kg).

3.1.4 Lithium Batteries. Per MIL-T-28800, lithium batteries are prohibited without prior authorization. A request for approval for the use of lithi batteries, including those encapsulated in integrated circuits, shall submitted to the procuring activity at the time of submission of proposal Approval shall apply only to the specific model proposed.

3.2 Environmental Requirements. The PG shall meet the environmental requirements for a Type II, Class 5, Style E equipment with the deviatio specified below.

3.2.1 Temperature and Humidity. The PG shall meet the conditions below:

	Temperature(°C)	Relative Humidity(%)
Operating	10 to 30	95
	30 to 40	75
Non-operating	-40 to 70	Not controlled

3.2.2 Electromagnetic Compatibility. The electromagnetic compatibility requirements of MIL-T-28800 are limited to the following areas: CE01, CE0 CS01, CS02, CS06, RE01, RE02 (14 kHz to 1 GHz), and RS03.

3.3 Reliability. Type II reliability requirements are as specified in MIL-T-28800.

3.3.1 Calibration Interval. The PG shall have an 85% or greater probability of remaining within tolerances of all requirements at the end of a 12 mon period.

3.4 Maintainability. The PG shall meet the Type II maintainability requirements as specified in MIL-T-28800 except the lowest discrete compone shall be defined as a replaceable assembly. Certification time shall n exceed 60 minutes.

3.5 Performance Requirements. The PG shall provide the following capabilities. Unless otherwise indicated, all performance requirements sha be met following a 30 minute warm-up period, over the temperature range +10(C to +40(C and with line voltage variation of +/-10%.

3.5.1 Pulse Generator Characteristics. The PG shall have a pulse output and a trigger output. The PG shall be capable of producing pulses of differe durations and spacings between pulses. The PG shall have the capability generating pulses with varying rise and fall times. The PG shall have doub pulse and pulse burst capabilities. The PG shall have the capability o accepting an external trigger signal and being manually triggered. The shall output a trigger pulse.

3.5.1.1 Pulse Period Range. The PG shall produce pulses with periods adjustable from 6.65 nanoseconds to 999.9 milliseconds.

3.5.1.2 Period Accuracy. The periods of the generated pulses shall have an uncertainty of no more than ((5% of the programmed value + 100 picoseconds)

3.5.1.3 Maximum Period Jitter. The period jitter shall be no more than ((0.03% of the programmed value + 25 picoseconds).

3.5.2 Pulse Width. The PG shall have a pulse width adjustable from 3.3 nanoseconds to 998 milliseconds, accurate within ((5% of the programmed va + 250 picoseconds).

3.5.2.1 Pulse Width Jitter. The pulse width jitter shall be no greater than ((0.03% of the programmed value + 25 picoseconds).

3.5.3 Pulse Delay. The PG shall have a time delay between the trigger and the output pulses that is variable from 0 to 998 milliseconds, measur between the 50%-of-amplitude points of the leading edges of the trigger out and the pulse output. The delay uncertainty shall be no greater than ((5% the programmed value + 1 nanosecond).

3.5.3.1 Pulse Delay Jitter. The pulse delay jitter shall be no more than ((0.03% of the programmed value + 25 picoseconds, rms).

3.5.4 Double Pulse. The PG shale have a selectable double pulse mode with a frequency range of 6.65 nanoseconds to 998 milliseconds, accurate to with ((5% of the programmed value + 1 nanosecond).

3.5.4.1 Double-Pulse Jitter. The double-pulse jitter shall be no more than ((0.03% of the programmed value + 25 picosecond, rms).

3.5.5 Pulse Burst. The PG shall have the ability to output a group of pulses with an adjustable count of from 2 to at least 65536 pulses or double pulse

3.5.6 Amplitude. The PG shall be adjustable in voltage amplitude from betwee 0.10 volts and 10.0 volts into a 50-ohm load.

3.5.6.1 Amplitude Uncertainty. The PG pulse shall have a voltage amplitude uncertainty of no greater than ((1% of programmed value + 50 millivolts) i a 50-ohm load.

3.5.6.2 mAplitude Settling Time. The PG pulse amplitude shall settle in 30 nanoseconds or less into the accuracy band specified in 3.5.6.1.

3.5.6.3 Overshoot, Preshoot and Ringing. The PG pulse shall not have overshoot, preshoot or ringing greater than ((5% of amplitude + 2 millivolts).

3.5.7 Leading/Trailing Edge Transition Time. The leading/trailing edge of the PG pulse shall have a minimum transition time (the time interval between t 10% and the 90% amplitude points) of 2.5 nanoseconds or less.

3.5.7.1 Transition-Time Accuracy. The PG shall have an uncertainty of leading/trailing edge transition time of no more than ((3% of the programm value + 1 nanoseconds).

3.5.7.2 Leading/Trailing Edge Non-linearity. The PG shall have a non-linearity in the leading/trailing edge of no greater than 3% of the pul amplitude for transition times greater than 100 nanoseconds.

3.5.8 Source Impedance. The PG shall have a source impedance which is adjustable to 50 ohms or 1000 ohms.

3.5.9 Input Trigger. The PG shall have an input for external trigger signals.

3.5.9.1 Input Trigger Impedance. The PG shall have selectable input impedances of 50 and 10,000 ohms.

3.5.9.2 Trigger Level. The PG shall respond to trigger levels of +0.25 volts to +10 volts and of -0.25 volts to -10 volts.

3.5.9.3 Maximum Trigger Input. The PG shall not be damaged by trigger input levels of (25 volts.

3.5.9.4 Trigger Slope. The PG shall be able to trigger on the positive- or negative-slope edges of the input signal, depending on the setting of t front panel.

3.5.9.5 Minimum Trigger Pulse Width. The PG shall be able to trigger on a pulse as narrow as 3.3 nanoseconds.

3.5.10 Output Trigger Amplitude. The PG shall have an output trigger amplitude of at least 2.5 volts into 50 ohms. The PG shall have an outp trigger source impedance of 50 ohms.

3.5.10.1 Output-Trigger-Pulse Width. The PG shall have a typical pulse width of 8 nanoseconds for a period of less than 100 nanoseconds, 40 nanoseconds periods between 100 nanoseconds and 1 microsecond and 400 nanoseconds f periods (1 microsecond.

3.5.11 Displays. The PG shall have front panel displays to show the parameter being set, the value of the parameter and the units of the parameter. T front panel shall have a remote operation indicator.

3.5.12 Connectors. The PG shall have BNC female connectors mounted on the front panel for the external trigger input, internal trigger output and pu output.

3.5.13 Derating of Accuracy. There shall be no derating of accuracy of the PG when operated in the temperature range 0 to 55 degree C and stored in t range -40 to 70 degree C.

3.6 Operating Requirements. The PG shall provide the following capabilities.

3.6.1 Front Panel Control Requirements. All modes and functions shall be operable using front panel controls. The location and labeling of indicato controls and switches shall provide for maximum clarity and easily underst operation without reference to tables, charts or flow diagrams.

3.6.2 Self Test. The self test shall determine operational readiness and isolate faulty modules.

3.6.2.1 Display. If the self test fails, the display shall indicate the nature of the failure and provide directions for diagnostic action.

3.7 Digital Interface. The PG shall provide a digital interface as specified in MIL-T-28800 and IEEE-488 General Purpose Interface Bus (GPIB).

3.7.1 Remote Programming Requirements. All modes, functions, and inputs/outputs of the PG shall be remotely programmable over the IEEE-4 General Purpose Interface Bus (GPIB).

3.7.2 GPIB Capabilities. The following IEEE-488 capabilities shall be provided:

T6 or TE - Talker,

L4 or LE4 - Listener,
SR1 - Service request,

3.7.3 Status Register Access Requirements. Access to status register shall be available via the IEEE-488 bus to ascertain PG mode, range and oth operational and error status.

3.7.4 Bus String Terminator Requirements. Terminators for a string of bus commands shall be a carriage return followed by line feed and EOI signal.

3.7.5 Bus Address Switch. Address must be selectable without removing any covers.

3.7.6 Bus Error Handling Requirements. Bus error reporting and recovery conventions shall be fully described in the Operation and Maintenance Manua

3.7.7 Compatibility. The PG, when used as part of an automated system, shall be capable of automatically energizing and /or calibrating applicable te instruments and measurement systems that are IEEE-488 bus configured. The shall be compatible with the Fluke 1722A and 1722A/AP Instrument Controller

3.8 Accessories. The following accessories shall be provided with each PG.

3.8.1 Power Cable. One power cable in accordance with MIL-T-28800, with minimum length of 6 feet (1.8 m).

3.9 Manual. At least two copies of an operation and maintenance manual shal be provided. The manual shall meet the requirements of MIL-M-7298.

3.9.1 Calibration Procedure. A calibration procedure in accordance with MIL-M-38793 shall be provided.